INSTALLATION INSTRUCTIONS FOR PACKAGE HEAT PUMP OR PACKAGE COOLING UNIT

ATTENTION INSTALLATION PERSONNEL

Prior to installation, thoroughly familiarize yourself with this installation manual. Observe all safety warnings.
During installation or repair, caution is to be observed.
It is your responsibility to install the product safely and to educate the customer on its safe use.

Keep this literature in a safe place for future reference.

Whirlpool Gold® Models
WGPH45AM, WPC45**AM**
WPIO-394

These installation instructions cover the outdoor installation of self-contained package air conditioner and heating units. See the Specification Sheets applicable to your model for information regarding accessories.

NOTE: Please contact your distributor or our website for the applicable Specification Sheets referred to in this manual.

Tradewinds Distributing Company, LLC
14610 Breakers Drive
Jacksonville, FL 32258

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HEAT PUMP/ELECTRIC COOLING SAFETY

The following symbols and labels are used throughout this manual to indicate immediate or potential safety hazards. It is the owner's and installer's responsibility to read and comply with all safety information and instructions accompanying these symbols. Failure to heed safety information increases the risk of personal injury, property damage and/or product damage.

Recognize this symbol as a safety precaution.

WARNING

Hazards or unsafe practices could result in property damage, product damage, severe personal injury or death.

CAUTION

Hazards or unsafe practices may result in property damage, product damage, personal injury or death.

CAUTION

Hazards or unsafe practices may result in property or product damage.

WARNING

Installation and repair of this unit should be performed ONLY by individuals meeting the requirements of an "Entry Level Technician," at a minimum, as specified by the Air-Conditioning, Heating and Refrigeration Institute (AHRI). Attempting to install or repair this unit without such background may result in product damage, personal injury or death.

WARNING

Do not connect to or use any device that is not design-certified for use with this unit. Serious property damage, personal injury, reduced unit performance and/or hazardous conditions may result from the use of such non-approved devices.

⚠ WARNING

Connecting unit ductwork to unauthorized heat producing devices such as a fireplace insert, stove, etc., may result in property damage, fire, carbon monoxide poisoning, explosion, personal injury or death.

⚠ WARNING

This product contains or produces a chemical or chemicals which may cause serious illness or death and which are known to the State of California to cause cancer, birth defects or other reproductive harm.

⚠ WARNING

HIGH VOLTAGE!

Disconnect ALL power before servicing.

Multiple power sources may be present.

Failure to do so may cause property damage, personal injury or death.

⚠ WARNING

This unit must not be used as a "construction heater" during the finishing phases of construction on a new structure. This type of use may result in premature failure of the unit due to extremely low return air temperatures and exposure to corrosive or very dirty atmospheres.

⚠ WARNING

To prevent the risk of property damage, personal injury, or death, do not store combustible materials or use gasoline or other flammable liquids or vapors in the vicinity of this unit.

TO THE INSTALLER

Carefully read all instructions for the installation prior to installing unit. Make sure each step or procedure is understood and any special considerations are taken into account before starting installation. Assemble all tools, hardware and supplies needed to complete the installation. Some items may need to be purchased locally.

After deciding where to install unit, closely look over the location—both the inside and outside of the home. Note any potential obstacles or problems that might be encountered as noted in this manual. Choose a more suitable location if necessary.

IMPORTANT NOTE: If a crankcase heater is used, the unit should be energized 24 hours prior to compressor start-up to ensure the crankcase heater has sufficiently warmed the compressor. Compressor damage may occur if this step is not followed.

IMPORTANT NOTE TO THE OWNER REGARDING PRODUCT WARRANTY

Your warranty certificate is supplied as a separate document with the unit installed by your contractor. Read the limited warranty certificate carefully to determine what is and is not covered. Keep the warranty certificate in a safe place. If you are unable to locate the warranty certificate, please contact your installing contractor, or contact customer service at 1-866-944-7575 to obtain a copy.

To receive the 10-Year Parts Limited Warranty, online registration must be completed within 60 days of installation. Online registration is not required in California or Quebec.

Full warranty details and instructions are available at www.whirlpoolhvac.com.

To register your unit, go to www.whirlpoolhvac.com. Click on the manufacturer's Comfort Commitment™ Warranty link located at the bottom center of the home page. Next, click on the Click Here to Register Your Product link located at the top center of the page, and complete the forms in the manner indicated.

SHIPPING INSPECTION

Upon receiving the unit, inspect it for damage from shipment. Claims for damage, either shipping or concealed, should be filed immediately with the shipping company. Check the unit model number, specifications, electrical characteristics and accessories to determine if they are correct. In the event an incorrect unit is shipped, it must be returned to the supplier and must not be installed. The manufacturer assumes no responsibility for installation of incorrectly shipped units.

REPLACEMENT PARTS

When reporting shortages or damages, or ordering repair parts, give the complete product model and serial numbers as stamped on the product. Replacement parts for this product are available through your contractor or local distributor. For the location of your nearest distributor, consult the white business pages, the yellow page section of the local telephone book or contact:

Tradewinds Distributing Company, LLC
14610 Breakers Drive
Jacksonville, Florida 32258
1-866-944-7575

If you are replacing an air handler, the system must be manufacturer-approved and Air-Conditioning, Heating, and Refrigeration Institute (AHRI) matched.

NOTE: Installation of unmatched systems is strongly discouraged.

CODES AND REGULATIONS

The WPC/WGPH M-series air conditioners and heat pumps are designed for outdoor use only. WGPH M-Series is available in cooling capacities of 2, 2½, 3, 3½, 4 and 5 nominal tons of cooling. WPC M-Series is available in cooling capacities of 2, 3 and 4 nominal tons of cooling. Optional field-installed heat kits are available in 5, 8, 10, 15 and 20 kW. The units can be easily installed in manufactured or modular homes with existing high-static ductwork. The units can also be easily converted to accommodate a plenum for normal or low-static applications.

The WPC/WGPH M-series are self-contained packaged units so the only connections needed for installation are the supply and return ducts, the line and low voltage wiring and drain connection. The units are ETL listed and AHRI certified.

The information on the rating plate is in compliance with the FTC and DOE rating for single-phase units. The efficiency ratings of these units are a product of thermal efficiency determined under continuous operating conditions independent of any installed system.

EPA Regulations

IMPORTANT: The United States environmental protection agency (EPA) has issued various regulations regarding the introduction and disposal of refrigerants in this unit. Failure to follow these regulations may harm the environment and can lead to the imposition of substantial fines. Because regulations may vary due to passage of new laws, we suggest a certified technician perform any work done on this unit. Should you have any questions, please contact the local office of the EPA.

National Codes

This product is designed and manufactured to permit installation in accordance with National Codes. It is the installer's responsibility to install the product in accordance with National Codes and/or prevailing local codes and regulations.

MAJOR COMPONENTS

The unit includes a hermetically sealed refrigerating system (consisting of a compressor, condenser coil, evaporator coil with flowrator), an indoor blower, a condenser fan and all necessary internal electrical wiring. The heat pump also includes a reversing valve, solenoid, defrost thermostat and control and loss of charge protection. The system is factory-evacuated, charged and performance tested. Refrigerant amount and type are indicated on rating plate.

PREINSTALLATION CHECKS

Before attempting any installation, the following points should be considered:

- Structural strength of supporting members
- Clearances and provision for servicing
- Power supply and wiring
- Air duct connections
- Drain facilities and connections
- Location may be on any 4 sides of a home, manufactured or modular, to minimize noise.

Clearances and Accessibility

The unit is designed to be located outside the building with unobstructed condenser air inlet and discharge. Additionally, the unit must be situated to permit access for service and installation. Condenser air enters from 3 sides. Air discharges upward from the top of the unit. Refrigerant gauge connections are made on the right side of the unit as you face the compressor compartment. Electrical connections can be made either on the right, bottom or duct panel side of the unit. The best and most common application is for the unit to be located 10" (25.4 cm) from the wall (4" [10.2 cm]) minimum) with the connection side facing the wall. Close to the wall application minimizes exposed wiring.

Unit Location

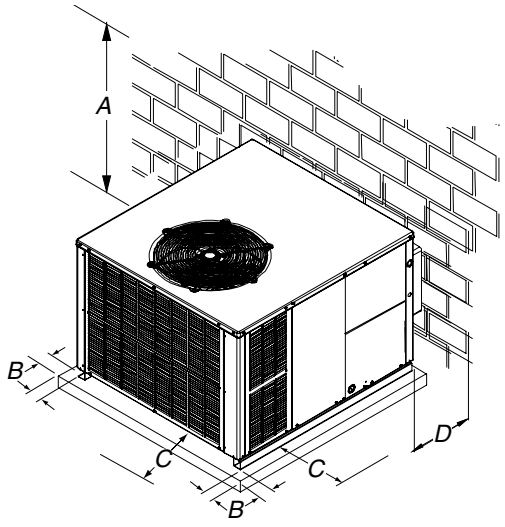
Consider the affect of outdoor fan noise on conditioned space and any adjacent occupied space. It is recommended that the unit be placed so that the condenser air discharge does not blow toward windows less than 25 ft (7.6 m) away. Consideration should also be given to shade and unit appearance.

Heat pumps require special location consideration in areas of heavy snow accumulation and/or areas with prolonged continuous subfreezing temperatures. Heat pump unit bases have holes under the outdoor coil to permit drainage of defrost water accumulation. The unit must be situated to permit free unobstructed drainage of the defrost water and ice. A minimum 2" (5 cm) clearance under the outdoor coil is required in the milder climates.

Ground Level Preinstallation Details

The unit should be set on a solid, level foundation—preferably a concrete slab at least 4" (10.2 cm) thick. The slab should be above ground level and surrounded by a graveled area for good drainage. Any slab used as a unit's foundation should not adjoin the building as it is possible that sound and vibration may be transmitted to the structure.

Ground Level Installation



A. 48" (121.9 m) minimum
B. 12" (30.5 cm) minimum
C. 36" (91.4 cm) minimum service clearance
D. 4" (10.2 cm) minimum

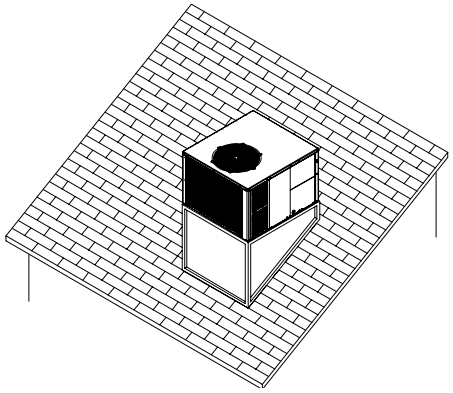
Rooftop Preinstallation Details

- Ensure that the roof is weather tight and allows proper drainage of condensation.
- Use steel or treated wood beams as unit support for load distribution.

NOTE: To ensure proper condensate drainage, unit must be installed in a level position.

- To avoid possible property damage or personal injury, the roof must have sufficient structural strength to carry the weight of the unit(s) and snow or water loads as required by local codes. Consult a structural engineer to determine the weight capabilities of the roof.
- The unit may be installed directly on wood floors or on Class A, Class B or Class C roof covering material.
- To avoid possible personal injury, a safe, flat surface for service personnel should be provided.

Rooftop Installation



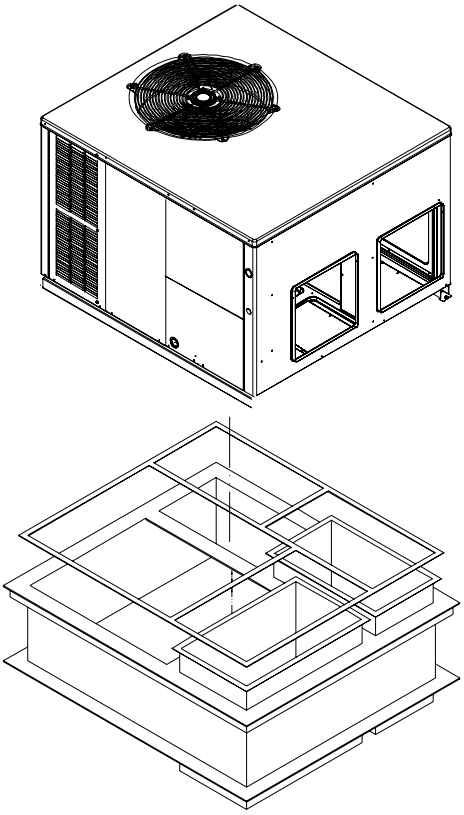
Roof Curb Installations Only

NOTE: Sufficient structural support must be determined prior to locating and mounting the curb and package unit.

Curb insulation, cant strips, flashing and general roofing material are furnished by the contractor.

Curbing must be installed in compliance with the National Roofing Contractors Association Manual. Construct ductwork using current industry guidelines. The ductwork must be placed into the roof curb before mounting the package unit.

Roof Curb Installation



Rigging Details

WARNING

To prevent property damage, the unit should remain in an upright position during all rigging and moving operations. To facilitate lifting and moving when a crane is used, place the unit in an adequate cable sling.

WARNING

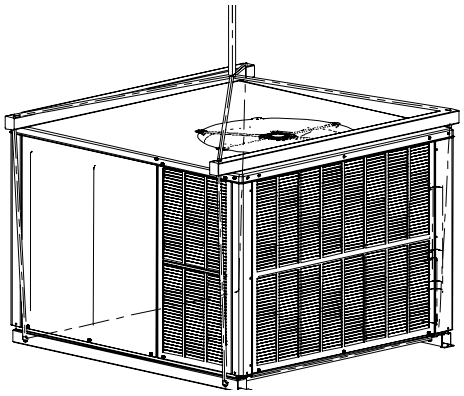
To prevent property damage, personal injury or death, ensure the roof has sufficient structural strength to carry the weight of the unit(s), roof curb, snow loads and water loads as required by local codes. Consult a structural engineer to determine the weight capabilities of the roof.

CAUTION

To avoid possible personal injury, a safe, flat surface for service personnel should be provided.

IMPORTANT: If you are using bottom discharge with roof curb, ductwork should be attached to the curb prior to installing the unit. Lower unit carefully onto roof mounting curb. While rigging unit, center of gravity will cause condenser end to be lower than supply air end.

Rigging



Airflow Conversion

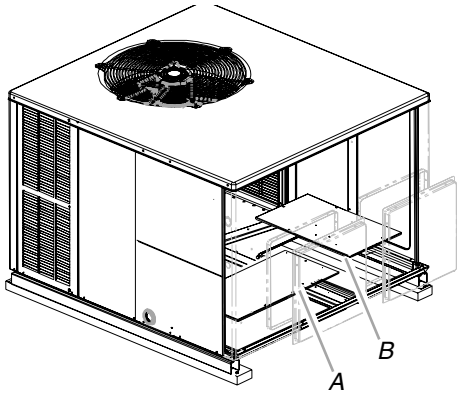
Units can easily be converted from horizontal to down-discharge airflow delivery. In down-discharge or high-static installations, the installer should measure the total external static and review the blower performance charts before performing the installation. In some installations, it will be necessary to change the blower speed to provide proper airflow.

Horizontal Airflow

Single-phase models are shipped without horizontal duct covers. If needed, these kits maybe ordered through the your local dealer or see “Assistance and Service.”

Duct Cover Installations—Down-Discharge

Remove the panels for down-discharge duct applications.



A. Supply air panel
B. Return air panel

Down-Discharge Applications

Cut insulation around bottom openings and remove panels from the bottom of the unit, saving the screws holding the panels in place.

NOTE: Down-discharge models require installation of horizontal duct kit Number 20464501PDGK (medium chassis) and Number 20464502PDGK (large chassis).

Ductwork

Duct systems and register sizes must be properly designed for the C.F.M. and external static pressure rating of the unit. Ductwork should be designed in accordance with the recommended methods of Air Conditioning Contractors of America Manual D (Residential) or Manual Q (Commercial).

All ductwork exposed to the outdoors must include a weatherproof barrier and adequate insulation. A duct system should be installed in accordance with Standards of the National Board of Fire Underwriters for the Installation of Air Conditioning, Warm Air Heating and Ventilating Systems. Pamphlets Number 90A and 90B.

The supply duct from the unit through a wall may be installed without clearance. However, minimum unit clearances must be maintained. The supply duct should be provided with an access panel large enough to inspect the air chamber downstream of the heat exchanger. A cover should be tightly attached to prevent air leaks.

For duct flange dimensions on the unit, refer to the Unit Dimension illustration in the Appendix.

For down-discharge applications, the ductwork should be attached to the roof curb prior to installing the unit. Ductwork dimensions are shown in the roof curb installation manual.

If desired, supply and return duct connections to the unit may be made with flexible connections to reduce possible unit operating sound transmission.

Filters

⚠ CAUTION

To prevent property damage due to fire and loss of equipment efficiency or equipment damage due to dust and lint build up on internal parts, never operate unit without an air filter installed in the return air system.

Filters are not provided with unit and must be supplied and externally installed in the return duct system by the installer. An optional factory-approved internal filter rack may also be used. A field-installed filter grille is recommended for easy and convenient access to the filters for periodic inspection and cleaning. When installing filters, ensure the airflow arrows on the filter are pointing toward the circulator blower.

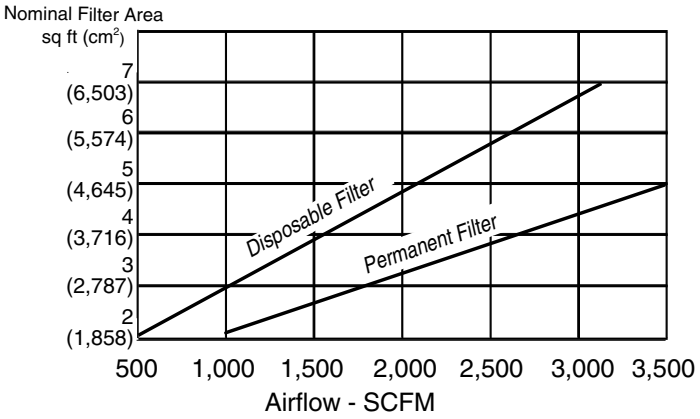
Refer to the following unit filter size chart for filter size information.

Minimum Filter Size

Nominal Size—in. (cm)	Nominal Area—sq ft (cm^2)
10 x 20 (25.4 x 50.8)	1.4 (1,301)
14 x 20 (35.6 x 50.8)	1.9 (1,765)
14 x 25 (35.6 x 63.5)	2.4 (2,230)
15 x 20 (38.1 x 50.8)	2.1 (1,951)
16 x 20 (40.6 x 50.8)	2.2 (2,044)
16 x 25 (40.6 x 63.5)	2.8 (2,601)
20 x 20 (50.8 x 50.8)	2.8 (2,601)
20 x 25 (50.8 x 63.5)	3.5 (3,252)
25 x 25 (63.5 x 63.5)	4.3 (3,995)

NOTE: Filters must have adequate face area for the rated quantity of the unit. See the Air Delivery Table for the recommended filter size. Size the filters in accordance with their manufacturer recommendations. Throwaway filters must be sized for a maximum face velocity of 300 ft per minute.

Air Delivery Table

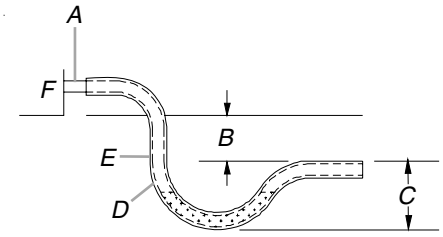


PIPING

Connect Condensate Drain

The condensate drain connection of the evaporator is a half coupling of ¾" N.P.T. A trap must be provided to have proper condensate drainage.

Condensate Drain Connection



A. Drain connection
B. 2" (5.1 cm) minimum
C. 3" (7.6 cm) minimum
D. Positive liquid seal (required)
E. Flexible tubing, hose or pipe
F. Unit

- Install the condensate drain trap as shown. Use a ¾" (1.9 cm) NPT drain connection size or larger.
- Do not operate without a trap.
- Unit must be level or slightly inclined toward drain.

WIRING

NOTE: All wiring should be made in accordance with the National Electrical Code (N.E.C).

Consult your local power company to determine the availability of sufficient power to operate the unit. Check the voltage, frequency and phase at the power supply to ensure it corresponds to the unit's rated voltage requirement.

In accordance with the N.E.C. or local codes, install a branch circuit fused disconnect near the unit. Determine wire sizes and overcurrent protection from the unit nameplate ampacity and in accordance with Branch Circuit Ampacity chart or the N.E.C. The wiring should never be sized smaller than is recommended by either of these 2 sources.

Fuses smaller than that recommended on the rating plate could result in unnecessary fuse failure or service calls. The use of protective devices of larger size than indicated could result in extensive damage to the equipment. The manufacturer bears no responsibility for damage caused to equipment as result of the use of larger than is recommended size protective devices.

All units have undergone a run test prior to packaging for shipment. This equipment has been started at minimum rated voltage and checked for satisfactory operation.

IMPORTANT: Do not attempt to operate this unit if the voltage is not within the minimum and maximum voltages shown on nameplate.

All exterior wiring must be within approved weatherproof conduit. The unit must be permanently grounded in accordance with local codes, or in absence of local codes, with N.E.C. ANSI/ NFPA Number 70-1984 or latest edition by using ground lug in the control box.

Fuses or HACR type circuit breakers may be used where codes permit.

IMPORTANT: Some single-phase units are equipped with a single-pole contactor. Exercise caution when servicing as only one leg of the power supply is broken with the contactor.

⚠ WARNING

HIGH VOLTAGE!

Disconnect ALL power before servicing.

Multiple power sources may be present.

Failure to do so may cause property damage, personal injury or death.

High Voltage Wiring

- Single Phase—2 leads should be connected to terminals L1 and L2 in the electrical control section, using wire sizes specified in the wiring diagram.

Low Voltage Wiring

- Heat Pumps—Connect 24V wires from the thermostat to the corresponding wires in the control box using Number 18 AWG as follows:

WPC15	**24 to 60**
Terminal	**Thermostat**
Red	R (24V)
Green	G (Fan)
Yellow	Y (Cool)
White	W1 (Heat)*
Brown	W2 (Heat)*
Blue	C (24V Common)

WGPH15 Terminal	**24 to 43 Thermostat**	**49 to 60 Thermostat**
Red	R (24V)	R (24V)
Green	G (Fan)	G (Fan)
Orange	O (Rev. Valve)	O (Rev. Valve)
White	W1 (Heat, 2nd)*	W1 (Heat, 2nd)*
Brown	W2 (Heat, 3rd)*	W2 (Heat, 3rd)*
Purple	Not Used	Y1 (Low Cool)
Yellow	Y (Cool)	Y2 (Hi Cool)
Blue	C (24V Common)	C (24V Common)

Thermostats must be set to energize G during cooling. This is a default on most all thermostats.

*Optional field installed heat connections

*WGPH1549 and WGPH1560 have 2-stage cooling and require 2-stage heat/cool with optional 3rd stage electric heat thermostat.

Internal Wiring

A diagram detailing the internal wiring of this unit is located on the electrical box cover. If any of the original wire supplied with the appliance must be replaced, the wire gauge and insulation must be the same as the original wiring.

Transformer is wired for 230 volts on the 208/230 models. See the wiring diagram for 208-volt wiring.

- For branch circuit wiring (main power supply to unit disconnect), the minimum wire size for the length of run can be determined using the circuit ampacity found on the unit rating plate and the following Branch Circuit Ampacity chart.
- From the unit disconnect to unit, the smallest wire size allowable may be used for the ampacity, as the Disconnect must be in sight of the unit.

Branch Circuit Ampacity								
Supply Wire Length—ft (m)	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**
200 (61)	6	4	4	4	3	3	2	2
150 (45.7)	8	6	6	4	4	4	3	3
100 (30.5)	10	8	8	6	6	6	4	4
50 (15.2)	14	12	10	10	8	8	6	6

- Wire size based on 60°C rated wire insulation and 30°C ambient temperature (86°F [30°C]).
- For more than 3 conductors in a raceway or cable, see the N.E.C. for derating the ampacity of each conductor.

START-UP, ADJUSTMENTS AND CHECKS

Start-up Procedure and Checklist—Cooling Cycle

⚠ WARNING

HIGH VOLTAGE!

Disconnect ALL power before servicing.

Multiple power sources may be present.

Failure to do so may cause property damage, personal injury or death.

1. Disconnect power at all disconnects.
2. Turn the thermostat system switch to “COOL” and the fan switch to “AUTO.”
3. Turn the temperature setting to the highest setting.
4. Inspect all of the registers and set them to the normal open position.
5. Turn on the electrical supply at the disconnect.
6. Turn the fan switch to the “ON” position. The blower should ramping up immediately.
7. Turn the fan switch to the “AUTO” position. The blower should begin ramping down after an approximate 60-second delay.
8. Slowly lower the cooling temperature until the unit starts. The compressor, blower and fan should now be operating.
9. Allow the unit to run for 10 minutes. Make sure that cool air is being supplied by the unit.
10. Turn the temperature setting to the highest position, stopping the unit. The indoor blower will continue to run for approximately 60 seconds.
11. Turn the thermostat system switch to “OFF” and disconnect all power when servicing the unit.

Start-up Procedure—Heat Pump

1. Check that the cooling mode for the heat pump is working properly according to the procedure listed in the "Start-up Procedure and Checklist—Cooling Cycle" section.
   - The reversing valve is energized when the thermostat is placed in the cooling position.
   - A clicking sound should be noticeable from the reversing valve.
   - By lowering the temperature setting to call for cooling, the contactor is energized.
   - The compressor, blower and fan should then be running.
2. After the cooling mode is checked out, turn the thermostat system switch to "OFF."
3. Turn the thermostat switch to "HEAT" and the fan switch to "AUTO."
4. Slowly raise the heating temperature setting. When the heating 1st stage makes contact, stop raising the temperature setting. The compressor, blower and fan should now be running with the reversing valve in the de-energized (heating) position.
5. After giving the unit time to settle out, make sure that the unit is supplying heated air.
6. If the outdoor ambient is above 80°F (26.7°C), the unit may trip on its high pressure cutout when on heating. The compressor should stop.

IMPORTANT: The heating cycle must be thoroughly checked, so postpone the test to another day when conditions are more suitable. Do not fail to test the unit.

7. If the outdoor ambient is low and the unit operates properly on the heating cycle, you may check the pressure cutout operation by blocking off the indoor return air until the unit trips.
8. If the unit operates properly in the heating cycle, raise the temperature setting until the heating 2nd stage makes contact. Supplemental resistance heat, if installed, should now turn on. Make sure that the supplemental resistant heat operates properly.

   NOTES:
   - WGPH1542-60 have 2 stages of compressor heat. During resistance heat test, increase the temperature setting until 3rd stage heat is energized.
   - If outdoor thermostats are installed, the outdoor ambient temperature must be below the set point of these thermostats for the heaters to operate. It may be necessary to jumper these thermostats to check heater operation if outdoor ambient temperature is mild.
9. For thermostats with emergency heat, raise the temperature setting until the heating 2nd stage makes contact. The emergency heat switch is located at the bottom of the thermostat. Move the switch to emergency heat. The heat pump will stop, the blower will continue to run, all heaters will come on and the thermostat emergency heat light will turn on.
10. If checking the unit in the wintertime when the outdoor coil is cold enough to activate the defrost control, observe at least one defrost cycle to make sure the unit defrosts completely.

Final System Checks

1. Check to see if all supply and return air grilles are adjusted and the air distribution system is balanced for the best compromise between heating and cooling.
2. Check for air leaks in the ductwork. Check the airflow and refrigerant charge. See "Airflow Measurement and Adjustment" and "Checking Charge."
3. Ensure that the unit is free of "rattles," and the tubing in the unit is free from excessive vibration.
4. Make sure that the tubes and lines are not rubbing against each other or against the sheet metal surfaces or edges. If contact is found, correct the trouble.
5. Ensure that the owner is instructed on the unit operation, filter, servicing, correct thermostat operation, etc.
6. Set the thermostat at the appropriate setting for cooling and heating or automatic changeover for normal use.
7. The previous sections are recommended to serve as an indication that the unit will operate normally.

COMPONENTS

Contactor

This control is activated (closed) by the room thermostat for both heating and cooling. The contactor has a 24V coil and supplies power to the compressor and outdoor fan motor.

Crankcase Heater

This item is "ON" whenever power is supplied to the unit and the crankcase heater thermostat is closed. The crankcase heater thermostat closes at 67°F (19°C) and opens at 85°F (29°C). It warms the compressor crankcase thereby preventing liquid migration and subsequent compressor damage. The insert type heater is self-regulating. It is connected electrically to the contactor L1 and L2 terminals.

Condenser Motor

This item is activated by the contactor during heating and cooling, except during defrost and emergency heat operation.

NOTE: On 460V heat pumps, the condenser motor is activated by the CMR.

Compressor

This item is activated by the contactor for heating and cooling, except during emergency heat. It is protected by an internal overload.

Contactor Relay

This control is activated by the thermostat (24V coil) and supplies power to the contactor.

Defrost Control

The Defrost control provides time/temperature initiation and termination of the defrost cycle. When a defrost cycle is initiated, the defrost control shifts the reversing valve to Cooling mode, stops the outdoor fan and brings on supplemental heat. Normally, a defrost cycle will take only 2 to 3 minutes unless the system is low on refrigerant charge or outdoor conditions are severe (windy and cold). The defrost control also provides for a 3-minute off-cycle compressor delay.

Outdoor Thermostat

These optional controls are used to prevent full electric heater operation at varying outdoor ambient (0°F to 45°F [-18ºC to 7ºC]). They are normally open above their set points and closed below to permit staging of the indoor supplement heater operation. If the outdoor ambient temperature is below 0° F (-18° C) with 50% or higher relative humidity (RH), an outdoor thermostat (OT) must be installed and set at (0°) on the dial. Failure to comply with this requirement may result in damage to the product which may not be covered by the manufacturer's warranty.

Reversing Valve Coil

This coil is activated by the thermostat, in the cooling mode and during defrost. It positions the reversing valve pilot valve for cooling operation.

Indoor Blower Motor

This is activated by setting the room thermostat to COOLING or FAN ON position. For WPC/WGPH models, the motor is energized directly by the room thermostat for X-13 motors. X-13 motors are constant torque motors with very low power consumption. For WGPH models, the motor is energized by the fan control board for ECM motors. ECM motors are constant CFM motors with very low power consumption. This motor is energized by a 24V signal from the thermostat. See "Airflow Measurement and Adjustment" for speed adjustment instructions.

HEAT PUMP OPERATION

Cooling Cycle

When the heat pump is in the cooling cycle, it operates exactly as a summer air conditioner unit.

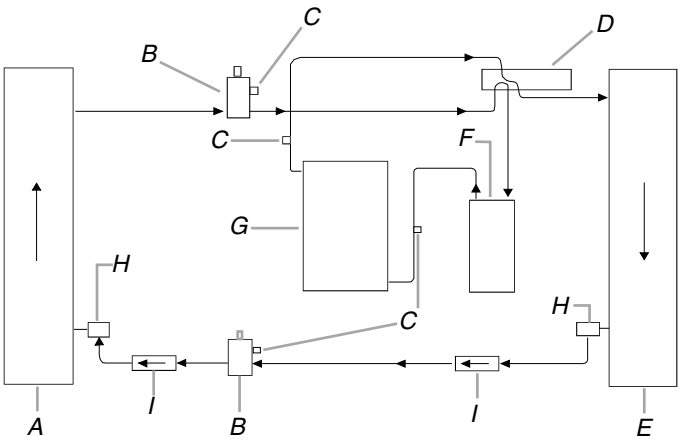
Heating Cycle

The heat pump operates in the heating cycle by redirecting refrigerant flow through the refrigerant circuit external to the compressor. This is accomplished through the reversing valve. Hot discharge vapor from the compressor is directed to the indoor coil (evaporator on the cooling cycle) where the heat is removed, and the vapor condenses to liquid. It then goes through the expansion device to the outdoor coil (condenser on the cooling cycle) where the liquid is evaporated, and the vapor goes to the compressor.

When the solenoid valve coil is operated either from heating to cooling or vice versa, the piston in the reversing valve to the low pressure (high pressure) reverse positions in the reversing valve.

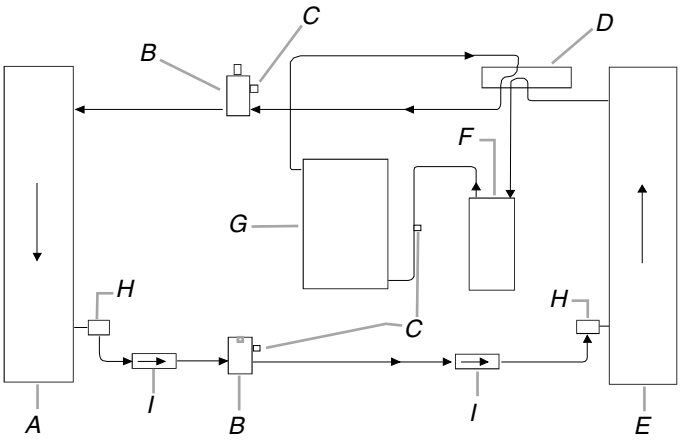
The following illustrations show a schematic of a heat pump on the cooling cycle and the heating cycle. In addition to a reversing valve, a heat pump is equipped with an expansion device and check valve for the indoor coil, and similar equipment for the outdoor coil. It is also provided with a defrost control system.

Cooling Cycle



A. Indoor coil *D. Reversing valve* *G. Compressor*
B. Service valves *E. Outdoor coil* *H. Distributors*
C. Service ports *F. Accumulator* *I. Check valve orifices*

Heating Cycle



A. Indoor coil *D. Reversing valve* *G. Compressor*
B. Service valves *E. Outdoor coil* *H. Distributors*
C. Service ports *F. Accumulator* *I. Check valve orifices*

The expansion devices are flowrator distributors and perform the same function on the heating cycle as on the cooling cycle. The flowrator distributors also act as check valves to allow for the reverse of refrigerant flow.

When the heat pump is on the heating cycle, the outdoor coil is functioning as an evaporator. The temperature of the refrigerant in the outdoor coil must be below the temperature of the outdoor air in order to extract heat from the air. Thus, the greater the difference in the outdoor temperature and the outdoor coil temperature, the greater the heating capacity of the heat pump. This phenomenon is a characteristic of a heat pump. It is a good practice to provide supplementary heat for all heat pump installations in areas where the temperature drops below 45°F (7°C). It is also a good practice to provide sufficient supplementary heat to handle the entire heating requirement should there be a component failure of the heat pump, such as a compressor, or refrigerant leak, etc.

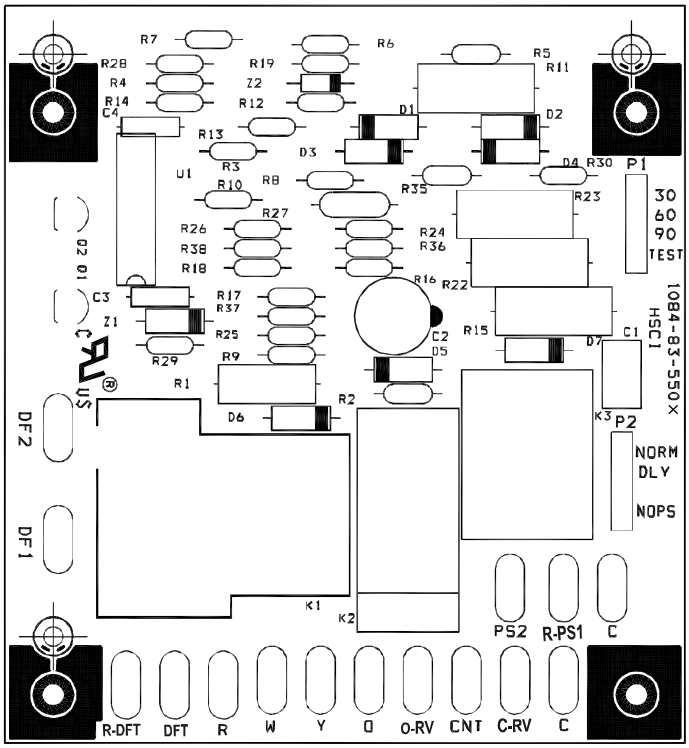
Since the temperature of the refrigerant in the outdoor coil on the heating cycle is generally below the freezing point, frost forms on the surfaces of the outdoor coil under certain weather conditions related to temperature and relative humidity. Therefore, it is necessary to reverse the flow of the refrigerant to provide hot gas in the outdoor coil to melt the frost accumulation. This is accomplished by reversing the heat pump to the cooling cycle. At the same time, the outdoor fan stops to hasten the temperature rise of the outdoor coil and lessen the time required for defrosting. The indoor blower continues to run and the supplementary heaters are energized.

Defrost Control

During operation, the power to the circuit board is controlled by a temperature sensor, which is clamped to a feeder tube entering the outdoor coil. Defrost timing periods of 30, 60 and 90 minutes may be selected by setting the circuit board jumper to 30, 60 and 90 respectively. Accumulation of time for the timing period selected starts when the sensor closes (approximately 34°F [5°C]), and when the wall thermostat calls for heat.

At the end of the timing period, the unit's defrost cycle will be initiated provided the sensor remains closed. When the sensor opens (approximately 60°F [16°C]), the defrost cycle is terminated and the timing period is reset. If the defrost cycle is not terminated due to the sensor temperature, a 12-minute override interrupts the unit's defrost period.

Circuit Board



SUGGESTED FIELD TESTING/ TROUBLESHOOTING

1. Run the unit in the heating mode (room thermostat calling for heat).
2. Check the unit for proper charge.

   NOTE: Bands of frost on the condenser coil indicate low refrigerant charge.
3. Turn off power to the unit.
4. Disconnect the outdoor fan by removing the outdoor fan motor wire from "DF2" on the defrost control.
5. Restart the unit and allow frost to accumulate.
6. After a few minutes of operation, the defrost thermostat should close. To verify this, check for 24 volts between "DFT" and "C" on the control board. If the temperature at the thermostat is less than 28°F (-2°C) and the thermostat is open, replace the defrost thermostat, since it is defective.
7. When the unit's defrost thermostat has closed, short the test pins on the circuit board until the reversing valve shifts, indicating defrost. This should take up to 21 seconds depending on what timing period the control is set.

NOTE: After defrost initiation, the short must instantly be removed, or the unit's defrost period will last only 2.3 seconds.

8. The control is shipped from the factory with the compressor delay option selected. This will de-energize the compressor contactor for 30 seconds on the defrost initiation and defrost termination. If the jumper is set to Normal, the compressor will continue to run during the defrost initiation and defrost termination. The control will also ignore the low pressure switch connected to R-PS1 and PS2 for 5 minutes upon defrost initiation and 5 minutes after defrost termination.
9. After the unit's defrost thermostat has terminated, check the defrost thermostat for 24 volts between "DFT" and "C." The reading should indicate 0 volts (open sensor).
10. Turn off power to the unit.
11. Replace the outdoor fan motor lead to terminal "DF2" on the circuit board and turn on power.

AIRFLOW MEASUREMENT AND ADJUSTMENT

After reviewing the “Ductwork” section in “Circulating Air and Filters,” proceed with the airflow measurements and adjustments.

The unit blower curves (see Specification Sheets) are based on the external static pressure (ESP per in./W.C.). The duct openings on the unit are considered internal static pressure. As long as ESP is maintained, the unit will deliver the proper air up to the maximum static pressure listed for the CFM required by the application (for example, home, building, etc.).

In general, 400 CFM per ton of cooling capacity is a rule of thumb. Some applications depending on the sensible and latent capacity requirements may need only 350 CFM or up to 425 CFM per ton. Check condition space load requirements (from load calculations) and equipment expanded ratings data to match CFM and capacity.

After the unit is set and the ductwork completed, verify the ESP with a 1" (2.5 cm) inclined manometer with pitot tubes or a Magnahelic gauge and confirm CFM to blower curves in the Specification Sheets. All units have 3-speed blower motors. If the low speed is not utilized, the speed tap can be changed to medium or high speed.

NOTE: Never run CFM below 350 CFM per ton. Evaporator freezing or poor unit performance is possible.

Airflow Adjustments for Indoor Blower Motor

X-13 Motor

Adjust the CFM by changing the 24V low-voltage lead at the speed terminal block on the motor (T1—Low Speed, T2 and T3—Medium Speed, T4 and T5—High Speed).

NOTE: Factory-set T1 (G, Fan), T2 (Cool/Hi Cool), T3 (W2 Electric Heat), T4 and T5 reserved for high static (Cool/Hi Cool) and W2, WGPH1548M41 and WGPH1560M41 Low Cool Y1 will run at G speed.

ECM Motor

The ECM control board is factory-set with DIP Switch 4 in the “ON” position for single-stage units and to the “OFF” position for the 2-stage units. All other DIP switches are factory-set in the “OFF” position. For most applications, the settings are to be changed according to the electric heat size.

The ECM motor provides many features not available on the traditional PSC motor. These features include:

- Improved efficiency
- Constant CFM
- Soft start and stop
- Improved humidity control

ECM Motor Speed Adjustment

Each ECM blower motor has been preprogrammed for operation at 4 distinct airflow levels when operating in Cooling/Heat Pump mode or Electric Heat mode. These 4 distinct levels may also be adjusted slightly lower or higher if desired. The adjustment between levels and the trim adjustments are made by changing the DIP Switch(s) either to an “OFF” or “ON” position. See “Blower Performance Data.”

WGPH45 DIP SWITCH FUNCTIONS

The ECM motor has an electronic control that contains eight 2-position DIP switches. The function of these DIP switches is shown in the following chart.

DIP Switch Number	Function
1	Electric Heat
2	
3	N/A
4	Indoor Thermostat
5	Cooling and Heat Pump CFM
6	
7	CFM Trim Adjust
8	

For WGPH4524-43 models, DIP Switch 4 must be set to ON. DIP Switch 4 must be set to OFF for 2-stage compressor models WGPH4549-60. DIP Switch 4 ON energizes Y1 signal to the ECM motor anytime Y/Y2 is energized. The indoor motor will not operate properly if switch is not set correctly for the model.

WGPH CFM Delivery and Adjustments

See “Blower Performance Data” for CFM output, adjustments and DIP switch settings.

WGPH Thermostat Fan Only Mode

During Fan Only operations, the CFM output is 50% of the high-stage cooling setting.

WGPH Humidity Control

When using a Humidistat (normally closed), cut jumper PJ6 on the control board. The Humidistat will affect both low-stage and high-stage cooling airflow by adjusting the airflow to 85%.

WGPH 2-Stage Heating

When using staged electric heat, cut jumper PJ4 on the control board.

WGPH Thermostat Wiring

Use the thermostat wiring diagrams provided with the thermostat when making these connections.

See “Blower Performance Data.”

BLOWER PERFORMANCE DATA

			E.S.P. (In. of H_2O)							
Model	**Speed**	**Volts—230**	**0.1**	**0.2**	**0.3**	**0.4**	**0.5**	**0.6**	**0.7**	**0.8**
WPC4524AM	T1 (G)	CFM	882	808	727	649	545	-	-	-
		Watts	82	86	92	102	108	-	-	-
	T2/T3	CFM	933	873	810	733	637	584	-	-
		Watts	93	103	109	120	126	135	-	-
	T4/T5	CFM	1,058	1,012	945	896	816	723	672	-
		Watts	124	136	142	153	168	172	179	-
WPC4530AM	T1 (G)	CFM	893	824	752	665	575	-	-	-
		Watts	87	95	101	111	115	-	-	-
	T2/T3	CFM	1,132	1,070	1,011	959	889	827	733	669
		Watts	153	162	168	179	184	195	206	208
	T4/T5	CFM	1,287	1,236	1,165	1,123	1,066	1,012	958	857
		Watts	211	217	228	239	244	255	265	272
WPC4536AM	T1 (G)	CFM	852	764	711	592	545	-	-	-
		Watts	80	82	86	95	99	-	-	-
	T2/T3	CFM	1,232	1,190	1,131	1,082	1,023	996	889	819
		Watts	202	214	221	229	235	246	258	264
	T4/T5	CFM	1,267	1,213	1,162	1,120	1,058	1,009	932	841
		Watts	218	226	236	245	247	260	272	275
WPC4542AM	T1	CFM	1,123	1,070	1,025	984	942	894	839	774
		Watts	162	170	182	193	204	216	229	242
	T2/T3	CFM	1,437	1,390	1,354	1,318	1,281	1,243	1,204	1,165
		Watts	310	317	331	342	355	366	377	389
	T4/T5	CFM	1,528	1,490	1,450	1,410	1,383	1,348	1,312	1,267
		Watts	372	379	391	403	416	427	439	451
WPC4548AM	T1	CFM	1,199	1,138	1,085	1,017	957	889	820	755
		Watts	162	173	185	193	211	219	232	245
	T2/T3	CFM	1,799	1,745	1,698	1,658	1,610	1,560	1,522	1,450
		Watts	480	493	508	521	531	545	550	547
	T4/T5	CFM	1,921	1,865	1,818	1,780	1,719	1,667	1,579	1,183
		Watts	582	585	602	625	627	621	595	569

NOTES:

- Data shown is dry coil. Wet coil pressure drop is approximately 0.2" H_20, for 3-row indoor coil; and 0.3" H_20, for 4-row indoor coil.
- Data shown does not include filter pressure drop, approximately 0.08" H_2O.
- All models should run no less than 350 CFM/Ton.
- Reduce airflow by 2% for 208-volt operation.

WGPH4524AM

Cooling/HP Speed	Adjust Tap	CFM*	Electric Heat	Adjust Tap	CFM*
D	Minus	630	D	Minus	630
D	Normal	700	D	Normal	700
D	Plus	770	D	Plus	770
C	Minus	743	C	Minus	743
C	Normal	825	C	Normal	825
C	Plus	908	C	Plus	908
B	Minus	855	B	Minus	855
B	Normal	950	B	Normal	950
B	Plus	1,045	B	Plus	1,045
A	Minus	945	A	Minus	945
A	Normal	1,050	A	Normal	1,050
A	Plus	1,155	A	Plus	1,155

*At 0.1 to 0.5 ESP

WGPH4530AM, WGPH4536AM

Cooling/HP Speed	Adjust Tap	CFM*	Electric Heat	Adjust Tap	CFM*
D	Minus	720	D	Minus	720
D	Normal	800	D	Normal	800
D	Plus	880	D	Plus	880
C	Minus	900	C	Minus	900
C	Normal	1,000	C	Normal	1,000
C	Plus	1,100	C	Plus	1,100
B	Minus	990	B	Minus	990
B	Normal	1,100	B	Normal	1,100
B	Plus	1,210	B	Plus	1,210
A	Minus	1,125	A	Minus	1,125
A	Normal	1,250	A	Normal	1,250
A	Plus	1,375	A	Plus	1,375

*At 0.1 to 0.5 ESP

WGPH4543AM, WGPH4549AM

Cooling/HP Speed	Adjust Tap	CFM*	Electric Heat	Adjust Tap	CFM*
D	Minus	1,103	D	Minus	1,103
D	Normal	1,225	D	Normal	1,225
D	Plus***	1,348	D	Plus	1,348
C	Minus**	1,260	C	Minus**	1,260
C	Normal	1,400	C	Normal	1,400
C	Plus	1,540	C	Plus	1,540
B	Minus	1,530	B	Minus	1,530
B	Normal	1,700	B	Normal	1,700
B	Plus	1,870	B	Plus	1,870
A	Minus	1,620	A	Minus	1,620
A	Normal	1,800	A	Normal	1,800
A	Plus	1,980	A	Plus***	1,980

*At 0.1 to 0.5 ESP
**Denotes factory setting for WGPH4543AM
***Denotes factory setting for WGPH4549AM

WGPH4560AM

Cooling/HP Speed	Adjust Tap	CFM*	Electric Heat	Adjust Tap	CFM*
D	Minus	1,260	D	Minus	1,260
D	Normal	1,400	D	Normal	1,400
D	Plus	1,540	D	Plus	1,540
C	Minus	1,440	C	Minus	1,440
C	Normal	1,600	C	Normal	1,600
C	Plus	1,760	C	Plus	1,760
B	Minus	1,620	B	Minus	1,620
B	Normal	1,800	B	Normal	1,800
B	Plus	1,980	B	Plus	1,980
A	Minus	1,800	A	Minus	1,800
A	Normal	2,000	A	Normal	2,000
A	Plus	2,200	A	Plus	2,200

*At 0.1 to 0.5 ESP

CFM Output for DIP Switch Combinations 1 and 2—Electric Heat

Model	Speed Tap	Switch 1	Switch 2	Electric Heat—CFM
WGPH4524	A	Off	Off	1,050(F)
	B	1,400	Off	950
	C	Off	On	825
	D	On	On	700
WGPH4530	A	Off	Off	1,250(F)
	B	On	Off	1,100
	C	Off	On	1,000
	D	On	On	800
WGPH4536	A	Off	Off	1,250(F)
	B	On	Off	1,100
	C	Off	On	1,000
	D	On	On	800
WGPH4543	A	Off	Off	1,800
	B	On	Off	1,700
	C	Off	On	1,400(F)
	D	On	On	1,225
WGPH4549	A	Off	Off	1,800
	B	On	Off	1,700
	C	Off	On	1,400
	D	On	On	1,225(F)
WGPH4560	A	Off	Off	2,000(F)
	B	On	Off	1,800
	C	Off	On	1,600
	D	On	On	1,400

(F) Factory setting

CFM Output for DIP Switch Combinations 5 and 6—Cooling/Heating

Model	Speed Tap	Switch 5	Switch 6	Cooling/HP—CFM
WGPH4524	A	Off	Off	1,050(F)
	B	1,400	Off	950
	C	Off	On	825
	D	On	On	700
WGPH4530	A	Off	Off	1,250(F)
	B	On	Off	1,100
	C	Off	On	1,000
	D	On	On	800
WGPH4536	A	Off	Off	1,250(F)
	B	On	Off	1,100
	C	Off	On	1,000
	D	On	On	800

CFM Output for DIP Switch Combinations 5 and 6—Cooling/Heating

Model	Speed Tap	Switch 5	Switch 6	Cooling/HP—CFM
WGPH4543	A	Off	Off	1,800
	B	On	Off	1,700
	C	Off	On	1,400(F)
	D	On	On	1,225
WGPH4549	A	Off	Off	1,800
	B	On	Off	1,700
	C	Off	On	1,400
	D	On	On	1,225(F)
WGPH4560	A	Off	Off	2,000(F)
	B	On	Off	1,800
	C	Off	On	1,600
	D	On	On	1,400

(F) Factory setting

DIP Switch Settings for Single- and 2-Stage Thermostats

Model	Switch 3	Switch 4	Thermostat
WGPH45**	N/A	On	Single-Stage
	N/A	Off	2-Stage

Adjustments Through DIP Switch Combinations 7 and 8

CFM	Switch 7	Switch 8
+10%	On	Off
Normal	Off	Off
-10%	Off	On

CHARGE VERIFICATION

Determine Superheat

1. Read suction pressure.
2. Determine Saturated Suction Temperature from tables or pressure gauge saturated temperature scale (R-410A).
3. Read suction line temperature.
4. Use the following formula to determine Superheat.

Superheat = Suction Line Temperature - Saturated Suction Temperature

Saturated Suction Pressure Temperature Chart

Suction Pressure	Saturated Suction Temperature ºF
PSIG	**R-410A**
50	1
52	3
54	4
56	6
58	7
60	8
62	10
64	11
66	13
68	14
70	15
72	16
74	17
76	19
78	20
80	21
85	24
90	26
95	29
100	31
110	36
120	41
130	45
140	49
150	53
160	56
170	60

Subcooling = Saturated Line Temperature - Liquid Line Temperature

Saturated Liquid Pressure Temperature Chart

Liquid Pressure	Saturated Liquid Temperature ºF
PSIG	**R-410A**
200	70
210	73
220	76
225	78
235	80
245	83
255	85
265	88
275	90
285	92
295	95
305	97
325	101
355	108
375	112
405	118
415	119
425	121
435	123
445	125
475	130
500	134
525	138
550	142
575	145
600	149
625	152

EXPANSION VALVE (TXV) SYSTEM

Single Speed Application—WPC45

1. Purge the gauge lines.
2. Connect the service gauge manifold to the access fittings. Run the system for at least 10 minutes to allow the pressure to stabilize.
3. Temporarily install a thermometer on the liquid (small) line near the liquid line access fitting with adequate contact and insulate for best possible reading.
4. Check subcooling and superheat. Systems with TXV application should have a subcooling of 10 + 2°F and superheat of 15ºF to 18ºF.
   - **a)** If subcooling and superheat are low, adjust TXV to 15ºF to 18ºF, and then check subcooling.
   - **b)** If subcooling is low and superheat is high, add charge to raise subcooling to 10ºF ± 2ºF then check superheat.
   - **c)** If subcooling and superheat are high, adjust TXV valve to 15ºF to 18ºF, and then check subcooling.
   - **d)** If subcooling is high and superheat is low, adjust TXV valve to 15ºG to 18ºF superheat and remove charge to lower the subcooling to 10ºF ± 2ºF.

NOTES:

- The TXV should not be adjusted at light load conditions of 55ºF (13ºC) to 60ºF (16ºC). Under such conditions, only the subcooling can be evaluated. This is because the suction pressure is dependent upon the indoor airflow and the wet bulb temperature.
- Do not adjust the charge based on the suction pressure unless there is a gross undercharge.

5. Disconnect the manifold set. Installation is complete.

2-Speed Application—WGPH45

Run the unit on low-stage cooling for 10 minutes until the refrigerant pressures stabilize. Follow the guidelines and methods below to check the unit operation and ensure that the refrigerant charge is within limits. Charge the unit on low stage.

1. Purge the gauge lines.
2. Connect the service gauge manifold to the access fittings. Run the system for at least 10 minutes to allow the pressure to stabilize.
3. Temporarily install a thermometer on the liquid (small) line near the liquid line access fitting with adequate contact and insulate for best possible reading.
4. Check subcooling and superheat. The 2-stage systems running on low stage with TXV application should have a subcooling of 5ºF to 7ºF and superheat of 15ºF to 18ºF.
   - **a)** If subcooling and superheat are low, adjust TXV to 15ºF to 18ºF superheat, then check subcooling.

     NOTE: To adjust superheat, turn the valve stem clockwise to increase and counterclockwise to decrease.
   - **b)** If subcooling is low and superheat is high, add charge to raise subcooling to 5ºF to 7ºF, and then check superheat.
   - **c)** If subcooling and superheat are high, adjust TXV valve to 15ºF to 18ºF superheat, and then check subcooling.
   - **d)** If subcooling is high and superheat is low, adjust TXV valve to 15ºF to 18ºF superheat and remove charge to lower the subcooling to 5ºF to 7ºF.

     NOTE: Do not adjust the charge based on the suction pressure unless there is a gross undercharge.
5. Disconnect the manifold set. Installation is complete.

Refrigerant Charge Check—Units with Fixed Orifice Devices

After completing the airflow measurements and adjustments, the unit's refrigerant charge must be checked. The unit comes factory-charged, but this charge is based on 325 CFM per ton and a minimum ESP per ARI test conditions (generally between 0.15 to 0.25 ESP). When air quantity or ESP is different than above, the refrigerant charge must be adjusted to the proper amount.

All package units with fixed orifice devices are charged using the superheat method at the compressor suction line.

For charging in the warmer months, 8ºF ± 3ºF superheat at the compressor is required at conditions 95ºF (35ºC) outdoor ambient (dry bulb) temperature, 80ºF (27ºC) dry bulb/67ºF (19ºC) wet bulb indoor ambient, approximately 50% humidity. This superheat varies when conditions vary from the conditions described.

After superheat is adjusted, it is recommended that the subcooling be checked at the condenser coil liquid line out. In most operating conditions, 10ºF to 15ºF of sub-cooling is adequate.

ELECTRIC HEAT INSTALLATION AND ADJUSTMENT

⚠ WARNING

HIGH VOLTAGE!

Disconnect ALL power before servicing.

Multiple power sources may be present.

Failure to do so may cause property damage, personal injury or death.

This series of electric cooling and heat pump package equipment is designed to accept a field installed electric heat kit. The unit is equipped to easily install the HKR Series Electric Heat Kit. Full installation instructions are included in this kit. Please use this document for guidance in field equipping the package unit with electric heat.

Choose the heat kit that fits the application for the specific installation. Permanently mark the unit's nameplate with the model being installed. High and low voltage connections are detailed in the heat kit instructions.

Indoor blower motor speed tap selection may need to be modified to accommodate normal continuous operation to prevent a nuisance trip. See the following charts.

WPC45(24-48) Models

	Electric Heat KW				
Unit Model Number	**5**	**8**	**10**	**15**	**20**
WPC4524AM41	3	3	3	x	x
WPC4530AM41	3	3	3	3	x
WPC4536AM41	3	3	3	3	x
WPC4542AM41	3	3	3	3	x
WPC4548AM41	3	3	3	3	3

All models are factory-shipped at T3 speed.

WGPH45(24-60) Models

	Electric Heat KW				
Unit Model Number	**5**	**8**	**10**	**15**	**20**
WGPH4524AM41	x	x	x		
WGPH4530AM41	x	x	x	x	
WGPH4536AM41	x	x	x	x	
WGPH4543AM41	x	x	x	x	
WGPH4549AM41	x	x	x	x	x
WGPH4560AM41	x	x	x	x	x

SYSTEM MAINTENANCE

⚠ WARNING

HIGH VOLTAGE!

Disconnect ALL power before servicing.

Multiple power sources may be present.

Failure to do so may cause property damage, personal injury or death.

The self-contained package air conditioner or heat pump should operate for many years without excessive service calls if the unit is installed properly. However, it is recommended that the homeowner inspect the unit before a seasonal start-up. The coils should be free of debris, so adequate airflow is achieved. The return and supply registers should be free of any obstructions. The filters should be cleaned or replaced.

These few steps will help to keep the product up time to a maximum. The System Troubleshooting chart should help in identifying problems if the unit does not operate properly.

Service

NOTE: The following information is for use by qualified service agency only. Others should not attempt to service this equipment.

Common Causes of Unsatisfactory Operation of Heat Pump on the Heating Cycle.

- Inadequate Air Volume Through Indoor Coil

  When a heat pump is in the heating cycle, the indoor coil is functioning as a condenser. The return air filter must always be clean, and sufficient air volume must pass through the indoor coil to prevent excessive discharge pressure, and high pressure cutout.

- Outside Air Into Return Duct

  Do not introduce cold outside air into the return duct of a heat pump installation. Do not allow air entering the indoor coil to drop below 65°F (18°C). Air below this temperature will cause low discharge pressure, thus low suction pressure, and excessive defrost cycling resulting in low heating output. It may also cause false defrosting.

- Undercharge

  An undercharged heat pump on the heating cycle will cause low discharge pressure resulting in low suction pressure and frost accumulation on the outdoor coil.

- Poor "Terminating" Sensor Contact

  The defrost terminating sensor must make good thermal contact with the outdoor coil tubing. Poor contact may not terminate the defrost cycle quickly enough to prevent the unit from cutting out on high discharge pressure.

- Malfunctioning Reversing Valve

  This may be due to:

  1. Solenoid not energized—In order to determine if the solenoid is energized, touch the nut that holds the solenoid cover in place with a screwdriver. If the nut magnetically holds the screwdriver, the solenoid is energized and the unit is in the cooling cycle.
  2. No voltage at the solenoid—Check unit voltage. If no voltage, check wiring circuit.
  3. Valve will not shift—If the unit is undercharged, check for leaks. If valve body damaged, replace valve. If unit is properly charged, and it is on the heating cycle, raise the discharge pressure by restricting airflow through the indoor coil. If the valve does not shift, tap it lightly on both ends with a screwdriver handle.

     NOTE: Do not tap the valve body.

     If the unit is on the cooling cycle, raise the discharge pressure by restricting airflow through the outdoor coil. If the valve does not shift after the above attempts, turn off the unit and wait until the discharge and suction pressure equalize, and repeat above steps. If the valve does not shift, replace it.

TROUBLESHOOTING CHART

Symptom	Possible Cause	Remedy
High head—low suction	■ Restriction in liquid line or flowrator	■ Remove or replace with proper size flowrator.
High head—high or normal suction	■ Dirty condenser coil ■ Overcharged ■ Condenser fan not running	■ Clean coil. ■ Correct system charge. ■ Repair or replace condenser fan.
Low head—high suction	■ Incorrect flowrator ■ Defective compressor valves ■ Flowrator not seating properly	■ Replace with correct flowrator. ■ Replace compressor. ■ Check for debris under flowrator or deformed flowrator. Remove debris or replace flowrator.
Unit will not run.	■ Power off or loose electrical connection ■ Thermostat out of calibration; set too high ■ Defective contactor ■ Blown fuses or tripped circuit breaker ■ Transformer defective ■ High or low pressure control (optional) open ■ Compressor overload contacts open	■ Check for unit voltage at contactor in unit. ■ Reset thermostat. ■ Check for 24 volts at contactor coil. Replace if contacts are open. ■ Replace fuse or reset circuit breaker. Check wiring. Replace transformer. ■ Reset high pressure control or check unit charge. High pressure control opens at 610 psig, and low pressure control opens at 22 psig. ■ Replace compressor. **NOTE:** Wait at least 2 hours for overload to reset.
Condenser fan runs; compressor does not run.	■ Loose connection ■ Compressor stuck ■ Grounded or open winding ■ Open internal overload ■ Low voltage connection ■ Capacitor weak, open or shorted	■ Check for unit voltage at compressor. ■ Check and tighten all connections. ■ Wait at least 2 hours for overload to reset. If still open, replace the compressor. ■ At compressor terminals, voltage must be within 10% of nameplate volts when unit is operating. ■ Check capacitor. Replace if defective.
Low suction—Cool compressor, iced evaporator coil	■ Low indoor airflow	■ Increase speed of blower or reduce restriction. ■ Replace air filters.
Compressor short cycles	■ Defective overload protector ■ Unit cycling on low pressure control ■ High pressure switch cuts out	■ Replace overload protector. Check for correct voltage. ■ Check refrigerant charge and/or airflow. ■ Check airflow (indoor and outdoor)
Registers sweat	■ Low airflow	■ Increase speed of blower or reduce restriction. ■ Replace air filters.
High suction pressure	■ Excessive load ■ Defective compressor ■ Reversing valve not seating properly.	■ Recheck load calculation ■ Replace compressor. ■ Replace reversing valve.
Insufficient cooling	■ Improperly sized unit ■ Improper airflow ■ Incorrect refrigerant charge. ■ Incorrect voltage	■ Recalculate load. ■ Check airflow—should be approximately 400 CFM per ton. ■ Charge per procedure attached to unit service panel. ■ At compressor terminals, voltage must be within 10% of nameplate volts when unit is operating.
Evaporator coil freezing or frosting	■ Low airflow ■ Low refrigerant charge ■ Operating unit in cooling mode below 65ºF (18ºC) outdoor temperature	■ Check airflow—should be approximately 400 CFM per ton. ■ Properly charge unit. ■ Install or check low ambient control—should be open below 65ºF (18ºC) outdoor temperature.

APPENDIX

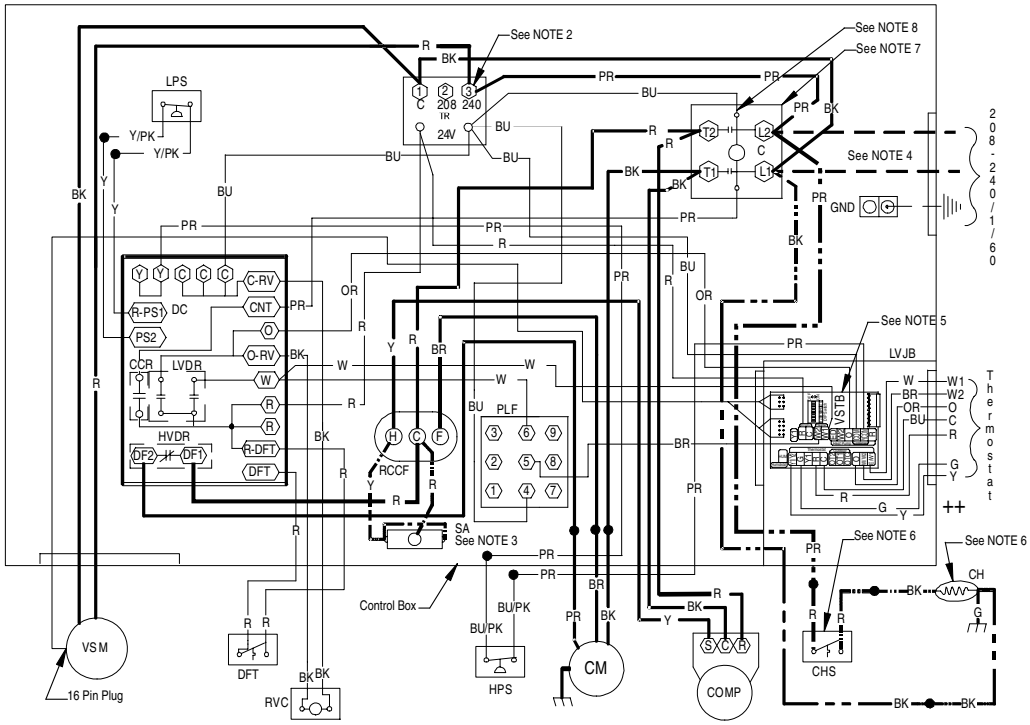
Wiring Diagram—WGPH45(24-43)AM

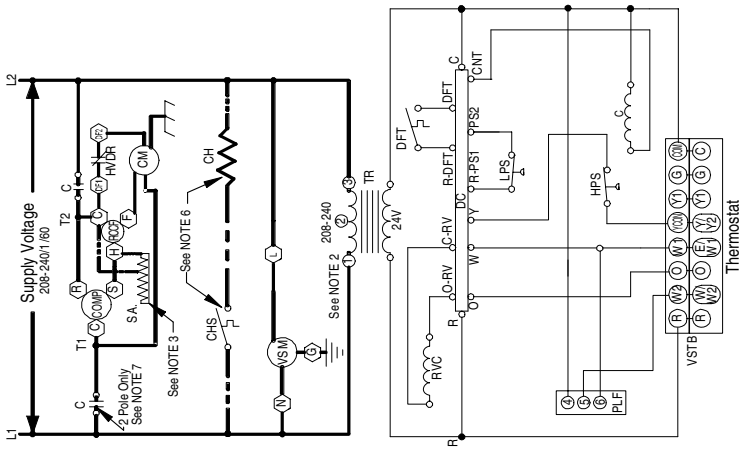
⚠ WARNING

HIGH VOLTAGE!

Disconnect ALL power before servicing.
Multiple power sources may be present.
Failure to do so may cause property damage, personal injury or death.

NOTE: Wiring is subject to change. Always refer to the wiring diagram on the unit for the most up-to-date wiring.





Component Legend

C	Contactor
CM	Condenser Motor
COMP	Compressor
DC	Defrost Control
DFT	Defrost Thermostat
GND	Equipment Ground
HPS	High Pressure Switch
HVDR	High Voltage Defrost Relay
LPS	Low Pressure Switch
LVDR	Low Voltage Defrost Relay
LVJB	Low Voltage Junction Box
PLF	Female Plug Connector
RVC	Reversing Valve Coil
RCCF	Run Capacitor for Compressor and Fan
SA	Start Assist
TR	Transformer
VSM	Variable Speed Motor
VSTB	Variable Speed Terminal Block

Symbol	Color
BK	Black
BU	Blue
BR	Brown
G	Green
OR	Orange
PR	Purple
R	Red
W	White
Y	Yellow
BU/PK	Blue/Pink

Factory Wiring
Line Voltage
Low Voltage
Optional High Voltage

Field Wiring
High Voltage
Low Voltage

208-240/1 /60 01 40G01638- A

NOTES:

1. Replacement wire must be the same size and the same type insulation as original (at least 105°C). Use copper conductor only.
2. For 208-volt transformer operation, move the purple and red wires from Terminal 3 to Terminal 2 on the transformer.
3. Start Assist factor-equipped, when required.
4. Use copper conductors only.

++ Use N.E.C. Class 2 wire.

5. Refer to installation instructions for speed setting.
6. Crankcase heater and crankcase heater switch factory-equipped, when required.
7. Double-pole contactor shown; single-pole contactor could be factory-equipped as an alternate configuration.
8. Common side of contactor cannot be grounded or connected to any other common (24V).
9. See unit rating plate for type and size of overcurrent protection.

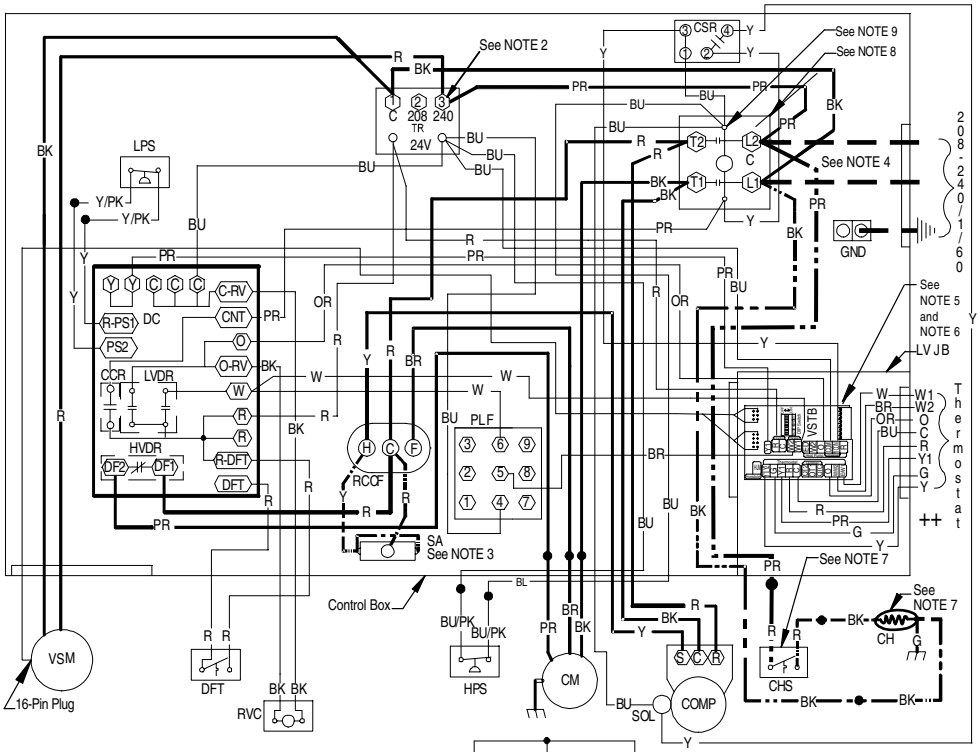
Wiring Diagram—WGPH45(49-60)AM

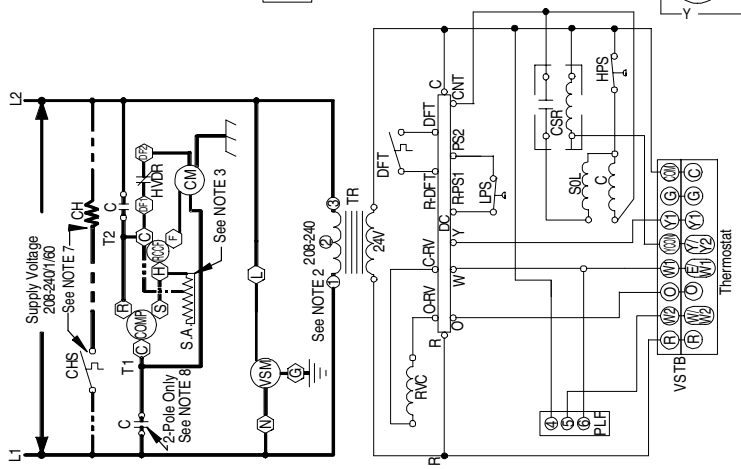
⚠ WARNING

HIGH VOLTAGE!

Disconnect ALL power before servicing.
Multiple power sources may be present.
Failure to do so may cause property damage, personal injury or death.

NOTE: Wiring is subject to change. Always refer to the wiring diagram on the unit for the most up-to-date wiring.





Component Legend

C	Contactor
CM	Condenser Motor
COMP	Compressor
DC	Defrost Control
DFT	Defrost Thermostat
GND	Equipment Ground
HPS	High Pressure Switch
HVDR	High Voltage Defrost Relay
LPS	Low Pressure Switch
LVDR	Low Voltage Defrost Relay
LVJB	Low Voltage Junction Box
PLF	Female Plug Connector
RVC	Reversing Valve Coil
RCCF	Run Capacitor for Compressor and Fan
SA	Start Assist
TR	Transformer
VSM	Variable Speed Motor
VSTB	Variable Speed Terminal Block

Symbol	Color
BK	Black
BU	Blue
BR	Brown
G	Green
OR	Orange
PR	Purple
R	Red
W	White
Y	Yellow
BU/PK	Blue/Pink

Factory Wiring
Line Voltage
Low Voltage
Optional High Voltage

Field Wiring
High Voltage
Low Voltage

208-240/1/60 01 40G01639- A

NOTES:

1. Replacement wire must be the same size and the same type insulation as original (at least 105ºC). Use copper conductor only.
2. For 208-volt transformer operation, move the purple wires from Terminal 3 to Terminal 2 on the transformer.
3. Start Assist factor equipped, when required.
4. Use copper conductors only.

++ Use N.E.C. Class 2 wire.

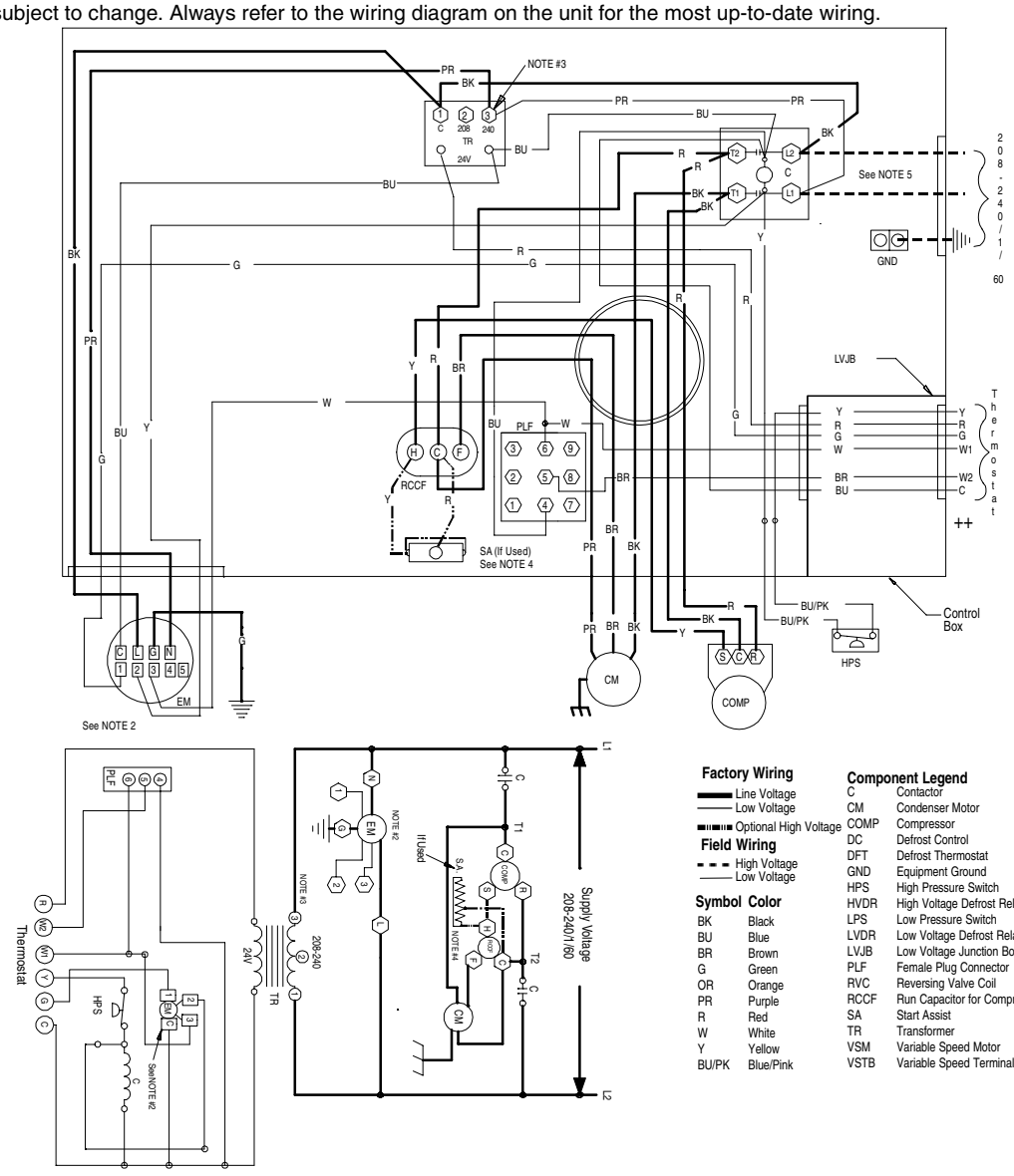
5. Set DIP Switch 4 on VSTB to Off position.
6. Refer to installation instructions for fan speed settings.
7. Crankcase heater and crankcase heater switch factory-equipped, when required.
8. Double-pole contactor shown; single-pole contactor could be factory-equipped as an alternate configuration.
9. Common side of contactor cannot be grounded or connected to any other common (24V).
10. See unit rating plate for type and size of overcurrent protection.

⚠ WARNING

HIGH VOLTAGE!

Disconnect ALL power before servicing.
Multiple power sources may be present.
Failure to do so may cause property damage, personal injury or death.

NOTE: Wiring is subject to change. Always refer to the wiring diagram on the unit for the most up-to-date wiring.

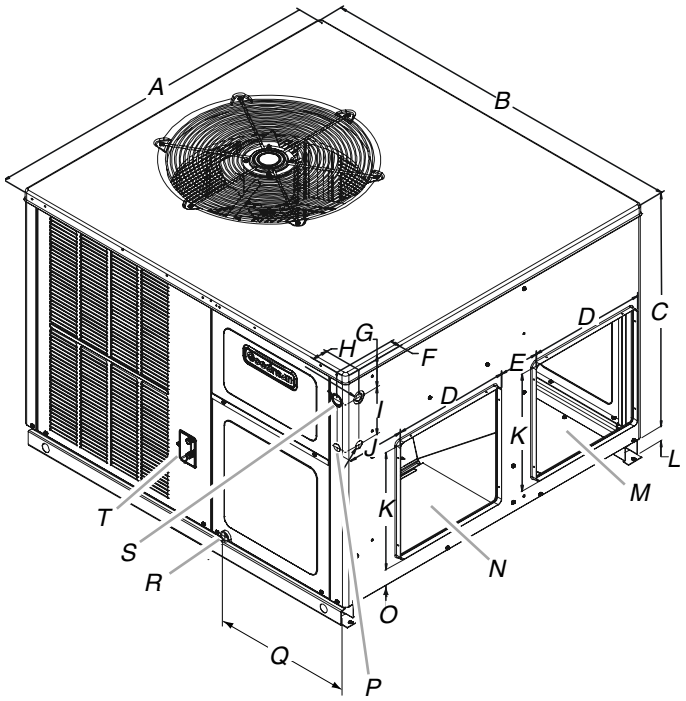


NOTES:

1. Replacement wire must be the same size and the same type insulation as original (at least 105ºC). Use copper conductor only.
2. To change the evaporator motor speed, move the white and yellow leads from the EM "2" and "3" to "4" and "5." If both leads are energized, the higher speed setting is used.
3. For 208-volt transformer operation, move the purple wires from Terminal 3 to Terminal 2 on the transformer.
4. Start assist factor equipped, when required.
5. Use copper conductors only.

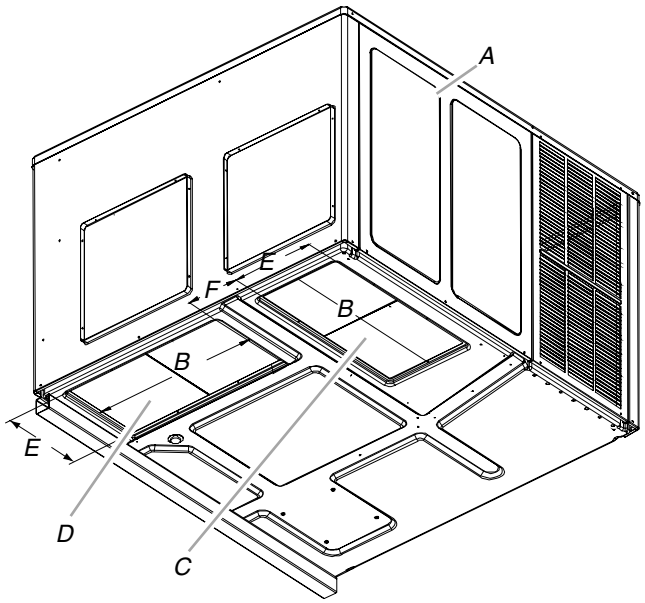
++ Use N.E.C. Class 2 wire

Unit Dimensions—Rear



A. 47" (119.4 cm)
B. 51" (129.5 cm)
C. Medium: 32" (81.3 cm); Large: 40" (101.6 cm)
D. 16" (40.6 cm)
E. 5½" (14 cm)
F. 1⅜" (3.5 cm)
G. 4⅛" (10.5 cm)
H. 2⅛" (5.4 cm)
I. 6½" (16.5 cm)
J. 8" (20.3 cm)
K. Medium: 16" (40.6 cm); Large: 18" (45.7 cm)
L. 2¾" (7 cm)
M. Air supply
N. Air return
O. 3" (7.6 cm)
P. Control wire entrance
Q. 18⅞" (47.9 cm)
R. Condensate drain connection—¾" (1.9 cm) NPT female
S. Control wire entrance
T. Suction/liquid pressure ports

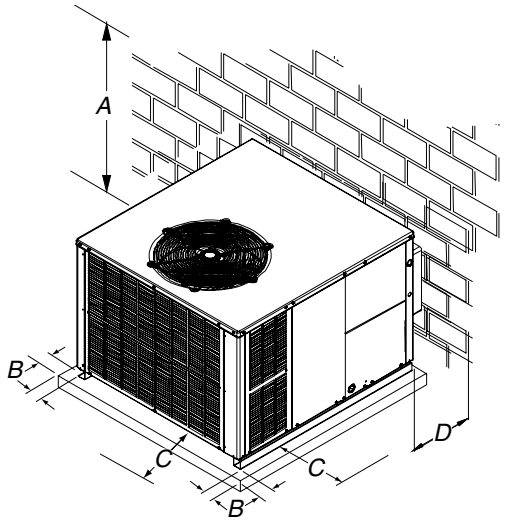
Unit Dimensions—Inside



A. Blower access panel
B. 22" (55.9 cm)
C. Air return
D. Air supply
E. 11" (27.9 cm)
F. 5¾" (14.6 cm)

Minimum Clearances

NOTE: Roof overhang should be no more than 36" (91.4 cm)



A. 48" (121.9 m) minimum
B. 12" (30.5 cm) minimum
C. 36" (91.4 cm) minimum service clearance
D. 3" (7.6 cm) minimum

ASSISTANCE OR SERVICE

If you need further assistance, you can write to the below address with any questions or concerns:

Tradewinds Distributing Company, LLC
14610 Breakers Drive
Jacksonville, FL 32258

Please include a daytime phone number in your correspondence.

Or call toll free: 1-866-944-7575.

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